

MODIS Team Meeting Minutes

Minutes of the MODIS Team Meeting held on Tuesday November 16, 1993.

Action Items:

70. Evaluate the thermal design of the Schaeffer Magnetics' motor/encoder. Assigned to Daelemans 8/31/93. Due 10/15/93
72. Investigate the adequacy of SBRC capability to maintain temperature plateaus during instrument testing in thermal vacuum. Assigned to Daelemans 10/12/93. Due 11/ 2/93 CLOSED 11/ 8/93
73. Complete the MODIS brochure and released for printing. Assigned to Bauernschub 10/18/93. Due 11/15/93.
74. Prepare and submit a Configuration Change Request which revises the definition and impact of levels of software criticality for the MODIS Software Management Requirements Document. Assigned to Anderson 10/26/93. Due 12/ 1/93
75. Determine if the four electronic module boxes can be individually thermal tested in air, or must the thermal testing be done in a vacuum. Assigned to Silva 10/26/93. Due 11/ 9/93
76. Provide a schedule of the SBRC internal CDRs. Assigned to Bauernschub 10/27/93. Due 11/23/93
77. Transfer review and approval of Class II changes to David Jones. Assigned to Anderson 11/ 2/93. Due 11/16/93
78. Recommend details of agreement with SBRC for GSFC access to near-real-time test data. Assigned to Montgomery 11/16/93. Due 12/ 7/93.

The following items were distributed:

- 1) Weekly Status Report #113
- 2) SBRC Memos submission from week #105
- 3) Minutes of the last team meeting

Attendees:

✓ Dick Weber	✓ Bruce Guenther	June Tveekrem
✓ John Bauernschub	✓ George Daelemans	✓ Bob Martineau
Rosemary Vail	John Barker	Bob Silva
Lisa Shears	Joann Harnden	Ken Brown
✓ Mike Roberto	Patricia Weir	Robert Kiwak
✓ Nelson Ferragut	Mitch Davis	✓ Harvey Saffren
✓ Gene Waluschka	Jack Ellis	✓ Ed Knight
Kate Forrest	✓ Ken Anderson	✓ Harry Montgomery
✓ Bill Barnes	✓ Rick Sabatino	Marvin Maxwell
✓ Les Thompson	✓ Cherie Congedo	

A dry run of the Critical Design Review (CDR) was held at SBRC on November 8 thru 10, and a dry run of the software CDR were held on November 11. There were also splinter sessions on consideration of dropping the MODIS Ground Based Calibrator (MGBC) and on converting the Engineering Model (EM) to a flight model. Tom Pagano presented preliminary results on the calculated transient response based on detector crosstalk data and optical ghosting along track and along scan for each focal plane. An update was received on the PC recovery plan NASA review action item list. There was also discussion regarding subjecting LWIR EM lots 1 and 2 to full flight quality test sequence to determine if they are flight quality.

Attendees from GSFC included Dick Weber, Ken Anderson, Bill Barnes, Bruce Guenther, Harry Montgomery, Bob Kiwak, Rick Sabatino, Paul Westmeyer, Bob Silva, June Tveekrem, David Jones, Les Thompson, and Mike Roberto. SBRC demonstrated that they should be ready for the CDR in January. A few suggestions from the dry run:

- 1.) more coordination on how the material is presented so it will be easier for the reviewers to determine overall instrument status and the status of each subsystem
- 2.) a reduction in the overall number of view graphs to get closer to 3 minutes per view graph
- 3.) use of backup material, as needed, to provide details which are not shown in the regular presentation.

Ken Anderson mentioned that COI is sending GSFC the drawings for the Aft Optics Platform (AOP) and Afocal Telescope Bench (AOB).

Nelson Ferragut discussed the motor/encoder CDR. John Sudey is still concerned about the calibration method proposed for the encoder. More information on this will be sent to GSFC. The gap for the encoder has been increased from 4 thousandths to 12 thousandths. The vibration test was not properly instrumented.

The use of small Be spheres before the HIP process for the Be has resulted in better material properties. El Segundo's report which comments on the SBRC material specifications for Be is due out soon.

Bill Mocarsky commented on some of the activities for the Integration and Test schedule being up to 300 days long.

George Daelemans heard that the radiant cooler door for the Mars Observer was opened on the way to Mars and the cooler got down to about 72K. George will be looking into the details to see if any conclusions can be drawn for MODIS.

Bob Martineau mentioned that five mockups (one with a large fillet and 4 with small fillets) have been temperature cycled 40 times while mounted to a Be pedestal and the new invar section of the MARS bar with no cracks forming. Previous temperature cycling of detector plus sapphire motherboard alone with large fillet had caused cracking. This may imply lower stresses in the detector when it is mounted to the Be and invar.

Bob discussed threshold problems with the readout integrated circuit (ROIC) silicon chips for the PV detectors for all focal planes for the protoflight and flight model detectors. A processing problem is expected. Adequate EM ROICs exist.

The ROIC chip consists of unit cells, scanner multiplexers, auto-bias and calibration circuits, address multiplexers, auto-clock circuits, push-pull outputs, and input/output pads. Each unit cell interfaces via indium bumps with a PV detector. The unit cell includes the Capacitive Trans Impedance Amplifier (CTIA), calibration circuit, detector select, clamp and frame store, and a buffer. The ROIC includes about

13 layers of processing. Examples of the various processing steps include: metalization, passivation, polysilicon, thermal oxide, implantation, contact, and field oxide.

The problem with the ROICs is with the P-MOS transistors which are formed in the field oxide step. The turn on voltage threshold for these transistors should have been -1.2 volts, rather than the measured value of -1.9 volts. At this time, the assumption is that the design is okay. Joe Banuck believes there was an error in the process of forming the P-MOS transistors. At this time, Joe is pessimistic about Carlsbad being able to complete the job. More information should be available in about a week.

If the error is found and can be readily corrected, there is a real advantage in having Carlsbad complete the ROICs for the protoflight and flight models. However, as has been noted, Hughes plans to reduce the workforce at Carlsbad by 50% this December and close this facility by next December.

SBRC is also accelerating the backup plan of finding another foundry to make the ROICs. One foundry under consideration is Orbit in California. Bob estimates the new foundry could take from 9 to 12 months to develop new ROICs. A pathfinder lot would need to be made. New masks and design rules may be required. The implementation of the readout circuits as integrated circuits would be dependent on the equipment and processes used by Orbit.

Rick Sabatino mentioned that SBRC has an ambitious, aggressive schedule to have the flight software material ready for CDR. The flight software should be at the detailed design level by CDR. Backup material will be ready. A consultant is now working on the software and an offer has been made for a second person. The definition of having MODIS data in near real time should be settled soon.

Ed Knight has recommended that each source for the SRCA be tested one at a time. At present SBRC plans to test 20 of the 88 SRCA configurations. Jim Young is looking at the set of tests; one bulb at a time tests may be substituted for some of the tests currently planned.

Ed had information on spectral filter performance. Filters for bands 18, 27, and 28 were fine. Band 19 had a center wavelength shift. The lower edge band was out of spec for bands 30 and 31, and the upper edge band was out of spec for band 31. The out of spec filter responses are being studied. Conclusions on acceptability should be made within the next few weeks.

A meeting on the Structural, Thermal, Optical (STOP) analysis was held on November 17th. Attendees included Cherie Congedo, George Daelemans, Dan Powers, Gene Waluschka, Qian Gong, Bill Case, Sandra Irish, and Mike Roberto. Cherie presented the STOP results. STOP error budgets for pointing and band to band registration are not met in several cases based on the differences between the instrument aligned on the ground at ambient temperature and the on-orbit cases. For pointing and registration changes, the major contributors are 1-g release and the initial cool down of the radiant cooler. SBRC will be accounting for and correcting on the ground, as needed, effects due to gravity and initial cool down of the radiant cooler. Registration and pointing changes due to thermal variations in an orbit are needed to determine if the planned ground adjustments will be sufficient to meet STOP error budgets.

Mike Roberto November 18, 1993